

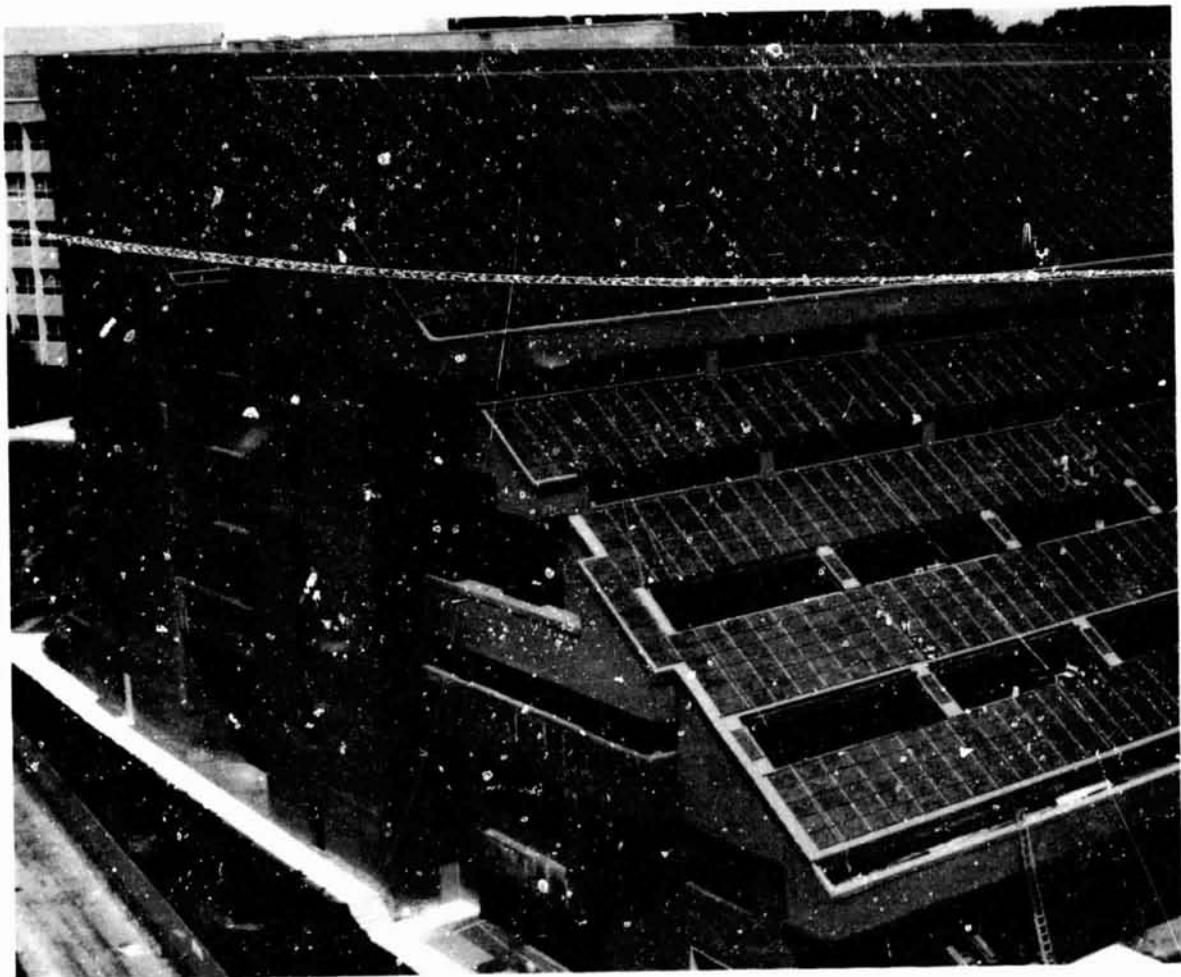
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N85-32400

GEORGETOWN UNIVERSITY PHOTOVOLTAIC HIGHER
EDUCATION NATIONAL EXEMPLAR FACILITY (PHENEF)

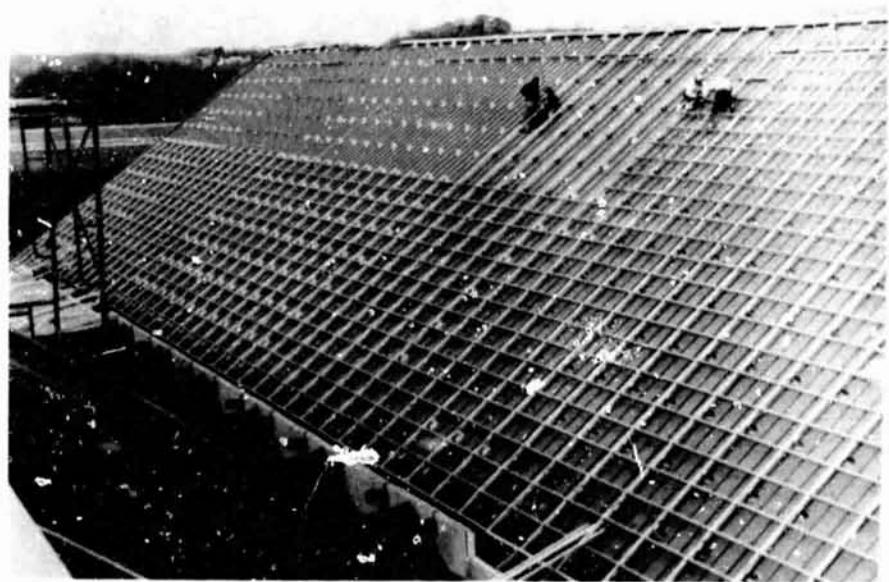
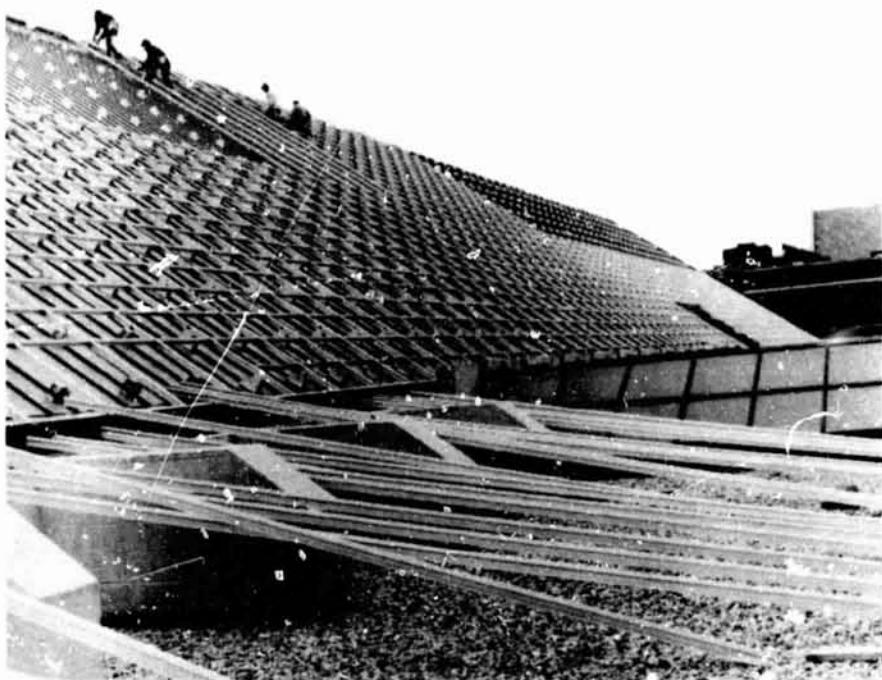
HUGHES AIRCRAFT CO.

Neil Marshall



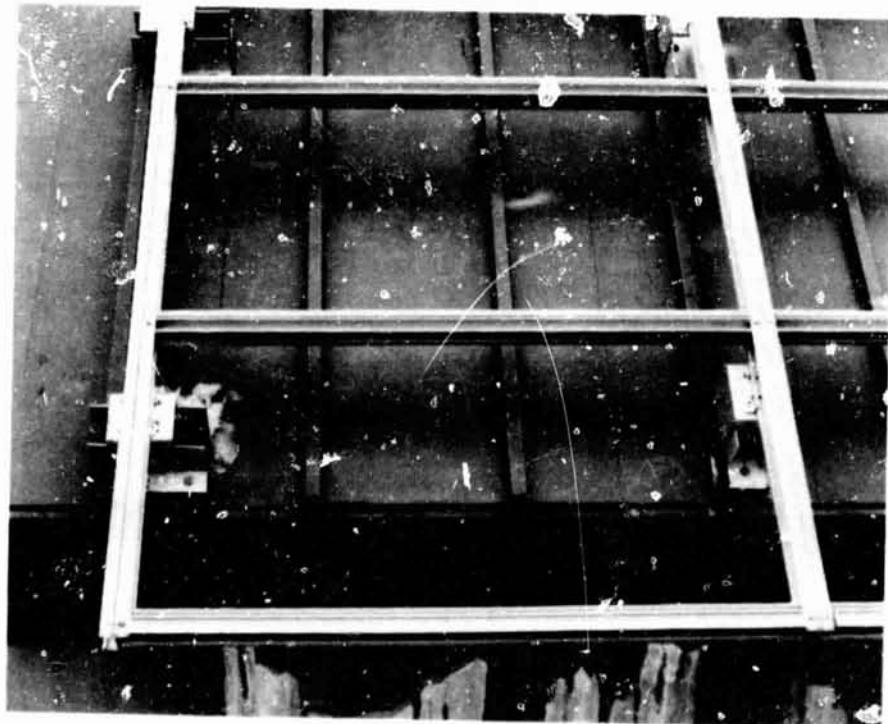
PLENARY SESSIONS

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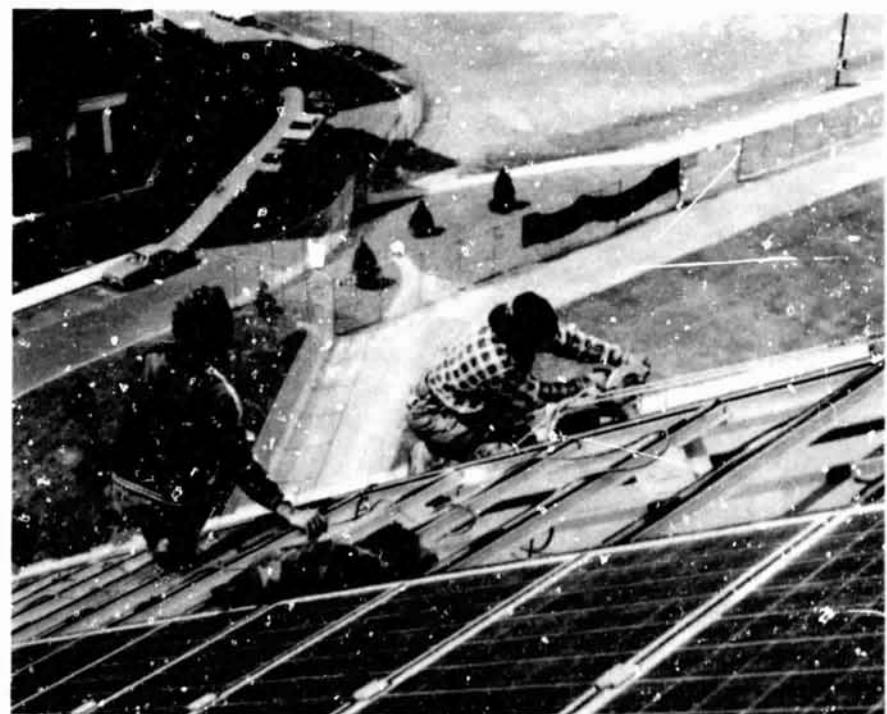


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PLENARY SESSIONS



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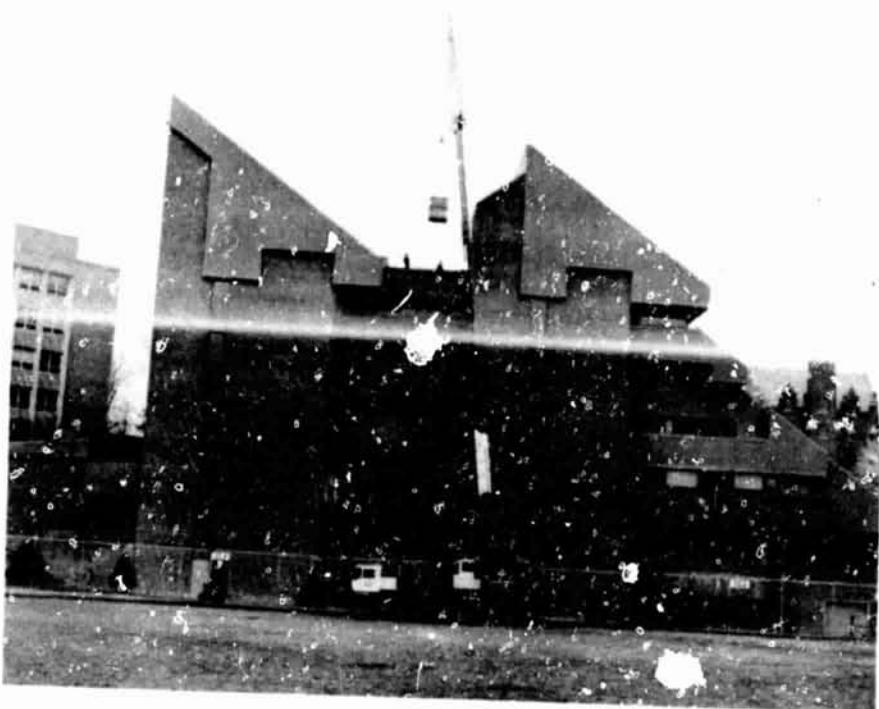


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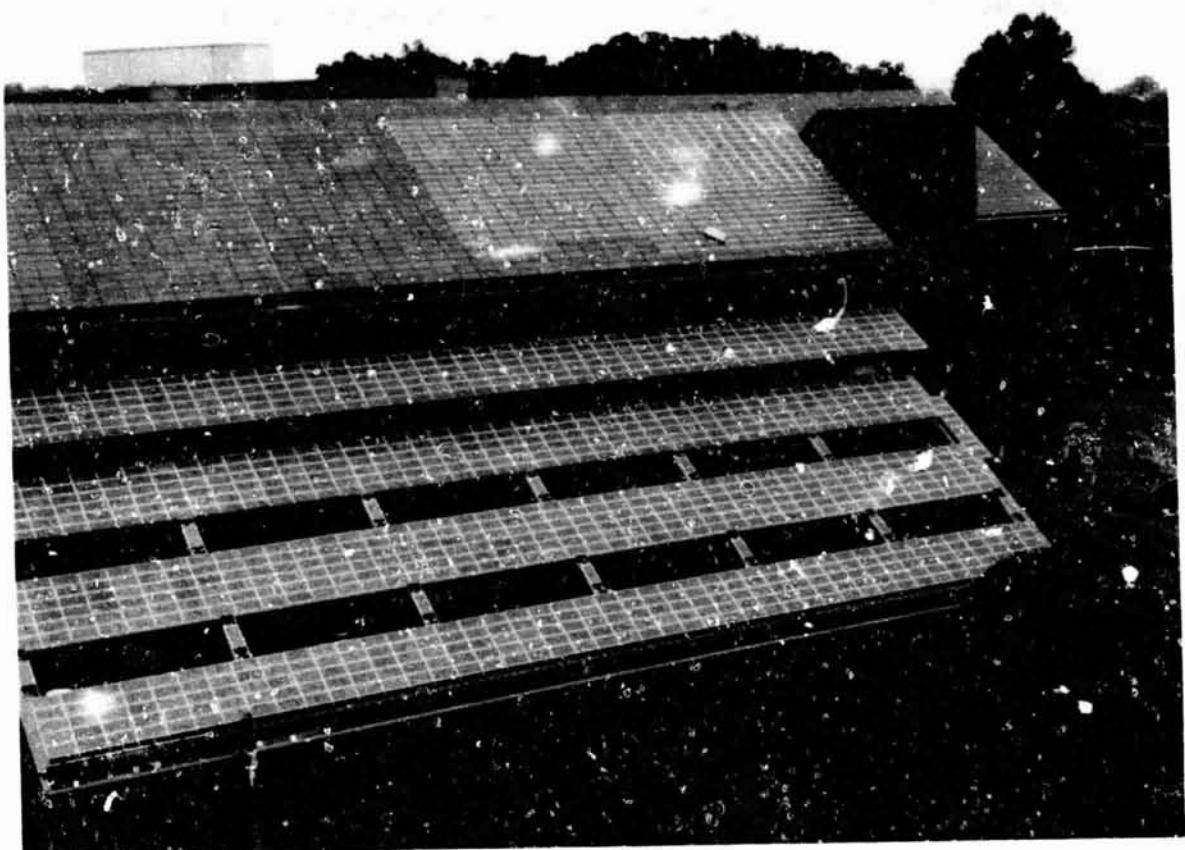


PLENARY SESSIONS



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PLENARY SESSIONS



PLENARY SESSIONS

Systems Requirements

- PV ARRAY DESIGN LIFETIME
 - 20 YEARS MINIMUM
- AVAILABLE ROOFTOP AREA
 - ABOUT 36,000 SQ. FT.
- ARRAY ROOFTOPS
 - WATERTIGHT
- INSTRUMENTATION NETWORK
 - ODAS; WEATHER STATION;
MODULES AND ROOFTOP
TEMPERATURE
- MAINTENANCE AND REPAIR
 - MODULE REMOVAL; TEST
EQUIPMENT; REMOTE MONITOR;
ALARMS
- SAFETY
 - ELECTRICAL; MECHANICAL;
SNOW/ICE

PLENARY SESSIONS

SYSTEM DESIGN AND WIRING TOPOLOGY

System Design and Performance

- PEAK POWER AT STANDARD CONDITIONS — 300 kw, MIN.

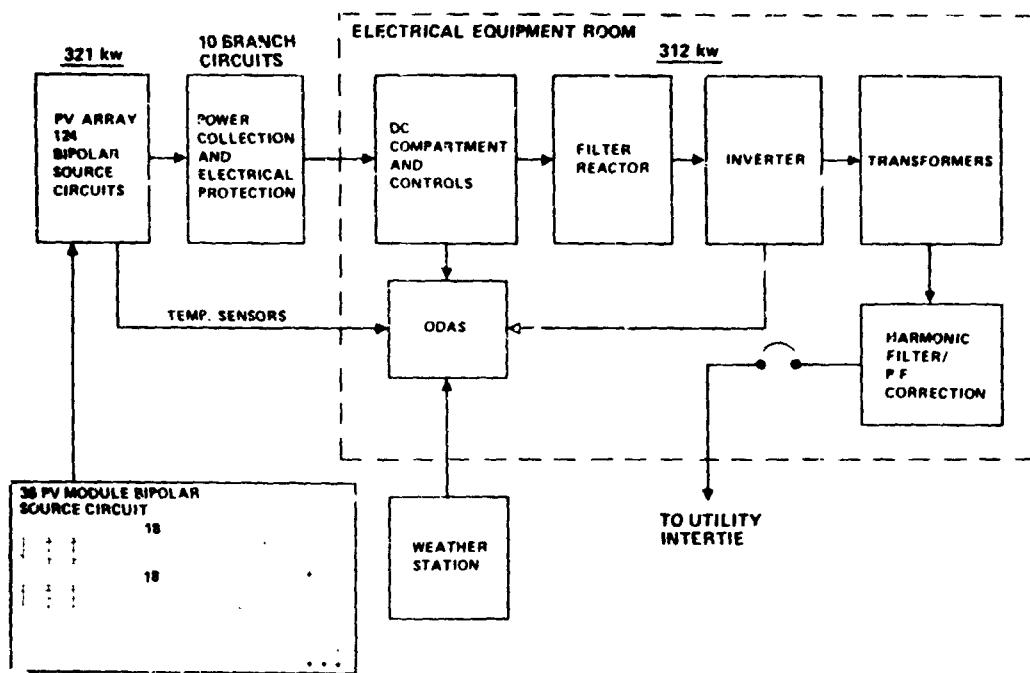
- ARRAY ELECTRICAL DESIGN — BIPOLAR, NEUTRAL RESISTIVELY GROUNDED

- ARRAY OUTPUT VOLTAGE — \pm 228 VDC

- MAIN BUS CURRENT AT PEAK POWER — 660 ADC

PLENARY SESSIONS

PHENEF Simplified Block Diagram



Module Electrical Characteristics

- 72 WATTS MINIMUM LOT AVERAGE AT 16.2 VOLTS
- 67 WATTS MODULE MINIMUM
- MEASURED AT 1000 W/M², AM 1.5, 28°C
- 3000 VOLT ELECTRICAL VOLTAGE INSULATION
- 3 ENCAPSULATED BYPASS DIODES (12 CELLS/DIODE)
- SOLARLOK CONNECTORS (UL RECOGNIZED)
- SIZE: TWO FT. BY FOUR FT. LAMINATE

PV Module

- FULLY TESTED BY JPL PER BLOCK V 5101-162
- PRODUCTION ADHERES TO PREDETERMINED MANUFACTURING PROCESSES
- MODULES SUBJECTED TO UL-790 FIRE RESISTANCE TEST
- FULL MECHANICAL/VISUAL INSPECTION
- PREDETERMINED ACCEPTANCE TEST PROCEDURES
 - HUGHES-FURNISHED REFERENCE CELL STANDARDS (DSET/ASTM #178)
 - CALIBRATED MODULES
 - SOURCE INSPECTION/LOT SAMPLES
- SOLAREX HAS DELIVERED MODULES ABOUT 4 PERCENT ABOVE SPECS.

PV Module Matching

- MODULES SEGREGATED INTO 12 CURRENT GRADES
- MODULES MATCHED TO WITHIN $\pm .025$ AMPS PER GRADE
- MODULES PACKAGED 18 PER BOX: SAME GRADE
 - ONE HALF BIPOLE
- ROOFTOP MODULE CIRCUIT LAYOUT MAPPED BY GRADE
 - LOWER PERFORMANCE GRADES INTO SHADOW PRONE AREAS

PLENARY SESSIONS

TEST EQUIPMENT

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